REMARKS

Please reconsider the application in view of the following remarks.

Disposition of Claims

Prior to this response, the application included claims 1-106. Applicants have cancelled claims 1-28, 34, 46, 47, 49, 53, 59, 62, and 101, and have added claims 107-109. Examiner has rejected claims 29-33, 35-45, 48, 50-52, 54-58, 60, 61, 63-100, and 102-106. Although the Office Action Summary says that claim 61 is rejected, the Examiner does not reject claim 61 in the Detailed Action. Since no grounds for rejection are stated, Applicants consider claim 61 to be allowable subject matter if rewritten in independent form. Accordingly, claims 29-33, 35-44, 48, 50-52, 54-58, 60, 61, 63-100, and 102-109 are presented for examination, with claims 29, 44, 45, 52, 100, 102, 103, 104, and 106 being in independent form. Applicants have amended claims 29 and 33 so that dependent claim 33 does not recite a thickness range that is broader than the range recited in independent claim 33. In particular, claim 29 now recites a thermoplastic bonding component having...a thickness between 1 micron and 150 microns, and claim 33 recites a thickness between 10 microns and 125 microns.

Rejections under 35 U.S.C. §112, first paragraph

The Office Action rejected claims 40-42, 45, 48, 50-52, 54-58, 60, 63-65, 79-81, 85-99, 102, 104, and 105 as failing to comply with the enablement requirement under 35 U.S.C. §112, first paragraph. The Examiner states that the specification does not enable a person of ordinary skill in the art how to heat bond a thermoplastic filter to a surface of a piezoelectric element. The Examiner argues that it appears that heating a thermoplastic filter to heat bond it to a surface would distort the shape and size of the holes. Applicants respectfully traverse.

A person of ordinary skill in the art would know how to heat bond a thermoplastic filter to a piezoelectric element. With respect to the distortion of a thermoplastic filter, the Applicants explain that the thermoplastic material of the thermoplastic bonding component can flow little during the bonding process. (Application, p. 4, lines 4-5) Since the thermoplastic material can

flow little, a person of ordinary skill in the art would understand that the shape and size of the holes of a thermoplastic filter will retain their shape and size.

Accordingly, applicants submit that claims 40-42, 45, 48, 50-52, 54-58, 60, 63-65, 79-81, 85-99, 102, 104, and 105 are enabled and respectfully request that the rejection under 35 U.S.C. 112, first paragraph be withdrawn.

Rejections under 35 U.S.C. §§102, 103

The Office Action rejects claims 44, 66-72, 76-78, and 100 under 35 U.S.C. 102(e) as being anticipated by Shigemura. (U.S. Patent No. 6,361,151).

Independent Claim 44

The Examiner rejected claim 44 as anticipated by Shigemura. Applicants have amended independent claim 44 to recite "A method of manufacturing an ink jet printing module comprising providing a thermoplastic bonding component having a plurality of openings, contacting the thermoplastic bonding component having a plurality of openings with a first component of an ink jet printing module having a surface." Applicants submit that Shigemura does not describe contacting the thermoplastic bonding component having a plurality of openings with a first component of an ink jet printing module. Rather, Shigemura describes:

> gluing a nozzle plate 7 at the end surface of the ink channels, such that there opens the plurality of nozzles, formed through excimer laser processing on the nozzle plate 7 of polyimide into the ink channels thereafter. (Shigemura, col. 7, lines 5-9)

The nozzle plate 7 is glued to the ink channels by applying a thermoplastic adhesive on one side by way of the nozzle plate 7. (Shigemura, col. 7, lines 14-16) Once the nozzle plate and ink channels are put together, holes are formed through the nozzle plate, through the thermoplastic adhesive, and into the ink channels. The thermoplastic adhesive does not have holes until after the thermoplastic adhesive contacts the ink channels. Shigemura does not disclose contacting the

thermoplastic bonding component having a plurality of openings with a first component of an ink jet printing module.

Accordingly, applicants submit that claim 44 is not anticipated and respectfully request that the rejection under 35 U.S.C. 102(e) be withdrawn. Furthermore, because claims 66-72 and 76-78 depend from claim 44, these dependent claims are not anticipated for at least the same reason that independent claim 44 is not anticipated.

The Examiner also rejected dependent claims 73-75 as being unpatentable over Shigemura in view of Moynihan et al (U.S. 6,755,511), and claims 82-85 as being unpatentable over Shigemura in view of DeYoung et al (U.S. 4,751,774). The Examiner acknowledges that Shigemura fails to disclose that the thermoplastic bonding component has a thickness between 10 micron and 125 microns, between 1 micron and 150 microns, and between 20 micron and 50 microns. The Examiner also acknowledges that Shigemura does not disclose adhering a protector strip over the orifice plate and a thermoplastic bonding material adjacent to the protector strip or orifice plate. However, Applicants submit that both Moynihan and DeYoung fail to disclose the feature lacking in Shigemura. Specifically, Moynihan and DeYoung do not disclose contacting the thermoplastic bonding component having a plurality of openings with a first component of an ink jet printing module.

Accordingly, applicants submit that claim 73-75 and 82-84 are not obvious and respectfully requests that the rejection under 35 U.S.C. 103 be withdrawn.

Independent Claim 100

The Examiner rejected claim 100 as anticipated by Shigemura. Independent claim 100 recites "An apparatus comprising...a thermoplastic bonding component having a plurality of openings, wherein the thermoplastic bonding component having a plurality of openings is heat-bonded to the surface of the piezoelectric element."

Applicants submit that Shigemura does not describe a thermoplastic bonding component having a plurality of openings, wherein the thermoplastic bonding component having a plurality of openings is heat-bonded to the surface of the piezoelectric element. Rather, Shigemura states:

> gluing a nozzle plate 7 at the end surface of the ink channels, such that there opens the plurality of nozzles, formed through excimer laser processing on the nozzle plate 7 of polyimide into the ink channels thereafter. (Shigemura, col. 7, lines 5-9)

The nozzle plate 7 is glued to the ink channels by applying a thermoplastic adhesive on one side by way of the nozzle plate 7. (Shigemura, col. 7, lines 14-16) Once the nozzle plate and ink channels are put together, holes are formed through the nozzle plate, through the thermoplastic adhesive, and into the ink channels. The thermoplastic adhesive does not have holes until after the thermoplastic adhesive contacts the ink channels. Shigemura does not disclose a thermoplastic bonding component having a plurality of openings, wherein the thermoplastic bonding component having a plurality of openings is heat-bonded to the surface of the piezoelectric element.

Accordingly, applicants submit that claim 100 is not anticipated and respectfully request that the rejection under 35 U.S.C. 102(e) be withdrawn.

The Office Action rejects claims 29-33, 36-39, 103, and 106 under 35 U.S.C. 103 as being unpatentable over Shigemura (U.S. Patent No. 6,361,151) in view of Moynihan et al (U.S. 6,755,511).

Independent Claim 29

The Examiner also rejected independent claim 29 as being unpatentable over Shigemura in view of Moynihan et al (U.S. 6,755,511). Applicants have amended claim 29 to recite "a thermoplastic bonding component having...a thickness between 1 micron and 150 microns." The Examiner acknowledges that Shigemura fails to disclose the thermoplastic bonding component has a thickness between 1 micron and 150 microns. However, Applicants submit Moynihan fails to disclose the feature lacking in Shigemura. Specifically, Shigemura does not disclose "An apparatus comprising...a thermoplastic bonding component, the thermoplastic bonding component having a plurality of openings, wherein the thermoplastic bonding

component having a plurality of openings is heat-bonded to the surface of the piezoelectric element."

Accordingly, applicants submit that claim 29 is are not obvious and respectfully request that the rejection under 35 U.S.C. 103 be withdrawn. Since claims 30-33 and 35-43 depend from claim 29, these dependent claims are not obvious for at least the same reason that independent claim 29 is not obvious.

There is another reason why dependent claim 35, in particular, is patentable over the combination of Shigemura and Moynihan. The Examiner acknowledges both Shigemura and Moynihan fail to disclose the thermoplastic bonding component has a thickness between 20 micron and 50 microns, as recited in claim 35. Examiner states that it would be obvious to modify the range of thickness of the thermoplastic bonding component in order to obtain an optimum effective bonding. However, Moynihan teaches away from a range greater than 0 to 15 microns. Moynihan states that the epoxy thickness has a thickness in the range of 0 to 15 microns, and the thickness must be zero in some places. (Moynihan, col. 5, lines 66-67; col. 6, lines 2-3) The epoxy layer must be sufficient to fill in the surface roughness of the piezoelectric element so as to provide a mechanical bond, but also thin enough so that it does not act as an insulator between the electrodes on the flex print. Thus, Moynihan teaches away from a thickness greater than 15 microns so that the epoxy does not act like an insulator.

The Examiner rejected dependent claim 43 as being unpatentable over Shigemura in view of Moynihan in further view of DeYoung et al (U.S. 4,751,774). The Examiner acknowledges that Shigemura in view of Moynihan fail to disclose a protector strip adhered to the orifice plate. However, Applicants submit DeYoung fails to disclose the feature lacking in Shigemura and Moynihan. Specifically, DeYoung does not disclose "An apparatus comprising...a thermoplastic bonding component, the thermoplastic bonding component having a plurality of openings, wherein the thermoplastic bonding component having a plurality of openings is heat-bonded to the surface of the piezoelectric element."

Accordingly, applicants submit that claim 43 is not obvious and respectfully request that the rejection under 35 U.S.C. 103 be withdrawn.

Independent Claim 103

The Examiner also rejected independent claim 103 as being unpatentable over Shigemura in view of Moynihan et al (U.S. 6,755,511). The Examiner acknowledges that Shigemura fails to disclose that the thermoplastic bonding component has a thickness between 20 micron and 50 microns, and the Examiner cites Moynihan as disclosing this feature. However, Moynihan does not disclose a thermoplastic bonding component, much less a thermoplastic bonding component with a thickness between 20 micron and 50 microns. Rather, Moynihan describes an epoxy layer, which is not the same as a thermoplastic bonding component, and the epoxy layer has a thickness between 0 and 15 microns.

Examiner further states that it would be obvious to modify the range of thickness of the thermoplastic bonding component in order to obtain an optimum effective bonding. However, Moynihan teaches away from a range greater than 0 to 15 microns. Moynihan states that the epoxy thickness has a thickness in the range of 0 to 15 microns, and the thickness must be zero in some places. (Moynihan, col. 5, lines 66-67; col. 6, lines 2-3) The epoxy layer must be sufficient to fill in the surface roughness of the piezoelectric element so as to provide a mechanical bond, but also thin enough so that it does not act as an insulator between the electrodes on the flex print. Thus, Moynihan teaches away from a thickness greater than 15 microns so that the epoxy does not act like an insulator.

Accordingly, applicants submit that claim 103 is not obvious and respectfully request that the rejection under 35 U.S.C. 103 be withdrawn.

Independent Claim 106

The Examiner also rejected independent claim 106 as being unpatentable over Shigemura in view of Moynihan et al (U.S. 6,755,511). The Examiner acknowledges that Shigemura fails to disclose that the thermoplastic bonding component has a thickness between 20 micron and 50 microns, and the Examiner cites Moynihan as disclosing this feature. However, Moynihan does not disclose a thermoplastic bonding component, much less a thermoplastic bonding component

with a thickness between 20 micron and 50 microns. Rather, Moynihan describes an epoxy layer, which is not the same as a thermoplastic bonding component, and the epoxy layer has a thickness between 0 and 15 microns.

Examiner further states that it would be obvious to modify the range of thickness of the thermoplastic bonding component in order to obtain an optimum effective bonding. However, Moynihan teaches away from a range greater than 0 to 15 microns. Moynihan states that the epoxy thickness has a thickness in the range of 0 to 15 microns, and the thickness must be zero in some places. (Moynihan, col. 5, lines 66-67; col. 6, lines 2-3) The epoxy layer must be sufficient to fill in the surface roughness of the piezoelectric element so as to provide a mechanical bond, but also thin enough so that it does not act as an insulator between the electrodes on the flex print. Thus, Moynihan teaches away from a thickness greater than 15 microns so that the epoxy does not act like an insulator.

Accordingly, applicants submit that claim 106 is not obvious and respectfully request that the rejection under 35 U.S.C. 103 be withdrawn.

Conclusion

Please charge our deposit account (06-1050) $120 for the one month petition for extension of time fee. Please apply any other charges or credits to deposit account 06-1050, referencing Attorney Docket Number 09991-014001.

Respectfully submitted,

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